A WEEK'S MOTHING IN BULGARIA, WITH SIX SPECIES OF LEPIDOPTERA NEW TO THE BULGARIAN FAUNA

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Abstract

Moths (Lepidoptera) were surveyed at six sites in south-west Bulgaria during the period 22 – 27 May 2002. A total of 265 species was identified and a further six are recorded but as yet unnamed. Six of the total – *Protasis punctella* (Costa) (Oecophoridae), *Coleophora valesianella* Zeller (Coleophoridae), *Cnephasia atticolana* (H.-S.), *Sciota adelphella* (F. v. R.) and *Lymphia chalybella* (Eversmann) (both Pyralidae) and *Cnaemidophorus rhododactyla* (D.&S.) appear to be new to the Bulgarian fauna. One further species, the geometrid *Dyscia conspersaria* (D.& S.) may be new to the Bulgarian fauna if it is shown to be distinct from *Dyscia sicanaria* (Oberthür), which was also taken. Details of all species recorded are presented and an anecdotal account of the survey and associated activities is given.

Why Bulgaria?

Back in the mists of time, before Winston Churchill's "Iron Curtain" came crashing down, CWP had sent a copy of his London butterfly book (Plant, 1987) to Bulgarian entomologist Stanislav Abadjiev, in Sofia. Later, and with some occasional interchange in the intervening years, this was reciprocated with a copy of Stanislav's Bulgarian butterfly atlas (Abadjiev, 2001) being received by CWP. Then, towards the end of 2001, Dr Abadjiev found himself visiting London for a short while to carry out research on the collections at the Natural History Museum and, predictably, spent a weekend as a guest of CWP. The inevitable question – "why don't you come and visit Bulgaria?" was raised and, never being one to miss an opportunity, the invitation was accepted. After all, Torben Larsen had referred to the place as "... something of an entomological paradise" after his visit in 1976 (Larsen, 1992), whilst Barry Goater's account of two weeks mothing in Bulgaria with Stoyan Beshkov during mid-September 1995 (Goater, 1996 – to say nothing of the verbal report) was tantalizing to say the least, although it was not expected that there would be anywhere near as many moths in the spring as there was in the early autumn. How wrong we were!

Getting there

We knew from experience that Budapest is a mere 19 hours drive away from Bishops Stortford (assuming no more than 15 minutes delay at the Channel Tunnel). It is also motorway all the way, barring the three miles from CWP's house to the M.11 (and the occasional wrong turning that takes one into Frankfurt city centre during morning rush hour!). From Budapest, there is first motorway and then dual carriageway all the way to the Romanian border at Naglac. However, we also knew from experience that the roads in Romania were of a quality some way below motorway standard ... those in Bulgaria, we were promised, were even worse. Nevertheless, we calculated that

with three drivers we ought to be able to reach the Bulgarian capital Sofia after 36 hours of continuous driving, subject to any delays that might be experienced at the ferry across the Danube, which forms the border between Romania and Bulgaria at Calafat/Vidin.

This was not as bad as it at first sounds. We did go in a camper van, and so even with all the generators and traps at least one person was able to sleep whilst one drove and the third acted as navigator. Thus, we were theoretically able to drive there non-stop, pausing only for the odd meal and to carry out essential natural functions. There was a delay, a very long one, at the Calafat-Vidin ferry, and we did get somewhat lost as we tried to find our way off the orbital motorway and into the outskirts of Sofia, but when all this was taken into account the journey actually took just 39 hours of driving.

For those intending to follow in our footsteps, there are a few pointers to consider. First, try to get through the Rhine Valley area of Germany at a time the does not involve the morning or evening rush hour or your progress will be reduced from a possible 120mph to around 20mph. We were also careful, on the basis of experience, to ensure that the journey across Romania was entirely accomplished during the hours of darkness. There are no ring roads, and the route passes through some busy town centres. Road signs are poor, opportunities for turning around are few and nobody speaks English. Western tourists are a rarity, a target for thieves and hold curiosity value for others. Travel by night allows one to actually stop in the town centre, read the road sign, reverse at major junctions and take the correct turning! It also avoids the countless beggars that are a feature of this very poor country and the policemen (both genuine and bogus) who issue on-the-spot fines for alleged speeding – even if you weren't. Indeed, one of the most useful things we took with us was a radar detector – so we *knew* that we were not speeding. CWP will be pleased to give more detailed advice to anyone who intends to travel this route.

The moths

It had not been an intention to collect moths en route. However, midnight found us on the Hungarian – Romanian border and with the prospect of no overnight garages for the next 300 miles we decided to fill up the van and the Jerry cans in Hungary. However, our attention was soon distracted. Almost immediately, whilst CWP pumped the fuel DF boxed half a dozen species attracted to the forecourt lights. A huge, freshly emerged female Reed Leopard *Phragmataecia castanea* (Hb.), its abdomen distended with eggs, fluttered around the digital display on the petrol pump, a male Fox Moth *Macrothylacia rubi* investigated the lead-free petrol vapour at the pump nozzle whilst Water Ermines *Spilosoma urticae* (Esper) formed a reasonable proportion of the "splats" on the forecourt itself. Clearly it was going to be a good trip.

Our next moth stop was at the Bulgarian Customs and Immigration kiosk. There are some 2,860 species of Lepidoptera in Bulgaria (Hubenov, et al, 1998); trapped between the glass window of the kiosk and a paper notice taped to it was number one ... a dead, but good condition, *Prodotis stolida*. We cannot profess to know exactly what it was that the Bulgarian Customs official said – but he *did* get the moth for us!

Our time proper in Bulgaria occupied six nights, during which we were guided, and accompanied, by Bulgaria's primary expert on butterflies, Stanislav Abadjiev and, forpart of the time, by Bulgarian Noctuidae expert Stoyan Beshkov and his dog Lisa! Night one, 22 May 2002, saw us at the edge of a beech Forest on upland calcareous grassland near Studen Kladenets, in the Osogovo Mountains, (42°.13'.6" N: 22°.39'.36" E), at around 1338 metres above sea level. We set up a vertical sheet at the edge of the woodland, and two skinner traps, one to each side at 100 metres distant. Almost immediately, the sheet started to attract a green moth that we took to be one of the European species of forester (*Adscita* sp.). Realising that our chances of performing an accurate field identification were slim, we boxed half a dozen for later examination. It was not until much later that it dawned upon us that these were not foresters at all, but were in fact a species of phycitine pyralid. The bright green colour caused much confusion (most books illustrate faded museum specimens) and it was eventually identified by CWP as *Lymphia chalybella*, using the genitalia drawings in Slamka (1997). The identity was confirmed for us by Mike Shaffer at the Natural History Museum and the species is new to the Bulgarian fauna.

The most numerous species, both in the traps and at the sheet was *Pachetra sagittigera*, the Feathered Ear, a species now almost certainly extinct in Britain and last positively identified here on the North Downs in 1963. It is interesting to discover just how many of Britain's extreme rarities are actually still very common in suitable habitat across much of eastern Europe in particular, where the habitat destruction so characteristic of "the west" has not yet really kicked in. The large female of *Minucia lunaris* (Lunar Double-stripe) also put in an appearance at the sheet, as did several examples of the tiger moth *Watsonarctia casta* (= *deserta*); this is not a common species in Bulgaria. Finally, an example of *Mythimna andereggii* ssp. *pseudocomma* – something of a look-alike for *Mythimna comma* but not quite right – put in an appearance.

Night two, on 23 May 2002, took us to what was, to the eye, the most interesting of all the sites that we visited; the moths were pretty good too, and the total of only 80 species noted reflects the early date of our visit. The village of Polska Skakavitsa is a totally isolated and somewhat dispersed settlement on the slopes of Mount Zemen at 42°.24'.36" N: 22°.40'.50"E, some 690 metres above sea level. Getting there was something of a challenge; fortunately, the camper van had evidently been a four-wheel drive in an earlier incarnation, though much of the time spent on site was spent wondering if we would ever get out again. Bee-eaters were the commonest bird on the way across the hillsides – or were there more Red-backed Shrikes? Zemen itself is a xerophilic, montane habitat and the vegetation is sparse and reminiscent of the garrigue. However, it is surrounded by broad-leaved, deciduous forests, which combine with the sparser areas to create a phenomenally varied biotope. We mounted a vertical sheet and ran four more lights up to 500 metres away – two standard aluminium Skinner traps and two wooden ALS Skinner-pattern traps; there was no discernible difference in the catches of the two types. Amongst the micros were two species – *Protasis punctella* and *Coleophora valesianella* – that are apparently new to the Bulgarian fauna. For this reason the identities were confirmed from slides of the

genitalia. This was the best site of the trip for plume moths (Pterophoridae) and the bag included *Stenoptilia zophodactylus*, *Capperia celeusi*, *Stangeia siceliota* as well as our own *Pterophorus pentadactyla*. We are indebted to Cees Gielis for most kindly naming the *Stenoptilia* and the *Capperia* from CWP's rather poor slides of the genitalia. Amongst the larger species there was also much interest. The lasiocampid *Phyllodesma ilicifolia* was fairly common as was the large *Saturnia pyri*, also known as the Southern Emperor. The Oak Hawk-moth *Marumba quercus* put in an appearance and this was the only site where we caught Pine Hawk *Hyloicus pinastri*. We later checked the genitalia of a male to make certain that it was not the morphologically identical *H. maurorum*, which replaces *pinastri* in much of southern Europe. Geometridae were numerous, and this was the only site where we found *Synopsia sociaria, Peribatodes umbraria*, the delicate green *Chlorissa viridata*, the wave *Scopula incanata* and *Scotopteryx vicinaria*, which looks a little like *S. bipunctaria*. A relative of our common Garden Carpet was *Xanthorhoe oxybiata* – though this is an altogether more attractive insect. I believe there has been a recent record of the notodontid *Harpyia milhauseri* in Britain; it is common in Eastern Europe and we caught several here. Noctuids included *Gonospileia triquetra*, *Cucullia tanaceti* and *Pseudoxestia apfelbecki* (not closely related to *Xestia* in spite of its generic name). A good series of both *Paradrina selini* and *P. clavipalpis* was collected; although differences are evident in a well-mounted series in a cabinet it is unwise to name either species over there by any means other than male genitalia.

Our third site, on the night of 24 May, was a damp grassland with plantations of poplar trees alongside the Skrino River at 42°.12'.18" N: 22°.5'5.56" E, approximately 430 metres above sea level. Here we were joined, at last, by Stoyan Beshkov and his dog Lisa – never a trip is made without her! After Lisa had given us a physical demonstration of the frailty of guy ropes and tent pegs, causing us to wonder if in fact the English method of a sheet on the ground might not after all be better than the vertically mounted European version, we settled down to catch moths. Two very freshly emerged *Athetis pallustris* were amongst the first to arrive, another species that seems to be in serious decline in Britain but which is doing quite nicely thank you elsewhere. Similar remarks apply to the Black-veined *Siona lineata*, a very common moth in calcareous grassland habitats in Hungary, parts of Romania and, now, here at Skrino; it is somewhat closer than a gnat's whisker to extinction in England. Without wishing in any way to appear critical of the dedicated and extremely thorough efforts of our friend Paul Waring, one is tempted to question the usefulness of pouring money into conservation of species that may simply be at the edge of their geographical range in Britain. Such dynamism in relation to the application and use of conservation status has been discussed by, for example, Kuchlein & Ellis (1997), who also give other references. The arrival of *Hadena luteago* was of especial interest. Recent taxonomic revision (Hacker et al, 2002) has shown that *H. luteago* does not occur in Britain, and that what we know colloquially as Barrett's Marbled Coronet is in fact subspecies *barrettii* (Doubleday) of *H. andalusica* (Stdgr.). The opportunity to examine the eastern race of *luteago* was, therefore, particularly welcomed. *Protodeltote pygarga, Copiphana olivina,*

Mythimna sicula and *Spilosoma urticae* were amongst other species recorded here but not seen at the other Bulgarian sites. The small green-coloured *Earias vernana* is similar to our own *E. clorana*, the Cream-bordered Green Pea, but has vague brown stripes across the forewings; we caught three examples.

The much advertised Struma Valley (41°.45'.31" N: 23°.09'.29" E; 236 metres above sea level), within the larger entity of the Kresna Gorge, getting down towards the border with Macedonia, occupied our fourth night. The gorge is something to be seen, though in most places it is not really safe to stop and get the camera out. Inevitably, the picturesque, winding road through this internationally important limestone gorge is threatened by the desire of politicians to put a motorway through it – in a straight line; it is, they argue, the main route from Sofia to Greece. Struma is the moth "hot spot" of Bulgaria. There are more moths here than anywhere else in the country, with a list of 822 "macros" [yes, that is just the "macros"] (Beshkov, 2001) – which rather makes even the best of British sites pale into absolute and total insignificance. The list includes eight taxa that are endemic! The highest percentage of rare insect species in Bulgaria are found within the Neuroptera (27.4%) and the Trichoptera (18.0%) and most of these (20.3%) are found in the Kresna Gorge (Hubenov, et al, 1998).

We were not disappointed. The highlight must surely have been the dozens of the Madder Hawk-moth *Rethera komarovi*, which presented themselves throughout the evening at the sheet. This is a striking green and yellow beast with silver stripes, about the size of a large *Macroglossum stellatarum*, that has only fairly recently become established in Europe – originating in the Iran/Iraq and Asian Turkey region. It was accompanied by *Hyles vespertilio*, *H. euphorbiae, Sphinx ligustri, Laothoe populi, Smerinthus ocellata* and *Mimas tiliae*, giving a site total of seven hawk-moth species on the one night. Indeed, we didn't do too badly for sphingids overall, with a total of 11 species for the trip. The pyralid *Sciota adelphella* presented itself as a single, badly worn female. Fortunately, the female genitalia of this species are distinctive and so correct identification was possible; this is another species apparently new to the Bulgarian fauna. Other pyralids here included *Melissoblaptes zelleri, Bradyrrhoa gilveolella* and *Platytes cerussella*. The geometrid *Glossotrophia confinaria* took some tracking down as far as naming is concerned. Others were more readily recognised, and included *Protorhoe unicata* and *Catarhoe permixtaria*, amongst others. One member of the Notodontidae of especial note was *Rhegmatophila alpina* ssp. *osmana*, of which we caught two. *Acronicta orientalis* was a new noctuid for all of us and both *Pechipogo plumigeralis* and *Zanclognatha lunalis* came in numbers for comparison. *Clytie syriaca* – the eastern European counterpart of *C. illunaris*, if in fact one believes they are different species – were also available for inspection. Several *Emmelia trabealis*, now extinct in Britain, were attracted, as were two *Abrostola agnorista*, a male and a female, confirmed from the acdeagus of the male. These are perhaps more easily confused with *Abrostola triplasia* (L.) – what we refer to as the Dark Spectacle – than with the other two species in Europe. Two over-wintered adults of the large grey noctuid *Lithophane merckii* were a pleasant addition to the list, though both were rather worn. The attractive *Hadena albimacula* was

common (another rarity in Britain). The Nolidae were represented by two species, *Meganola gigantula* and *M. albula*. The day-flying *Amata phegea* was frequent and larvae of *Sinyra nervosa* were equally numerous. We also caught the geometrid *Dyscia conspersaria*, and this may be new to the Bulgarian fauna. Both this and *Dyscia sicanaria* (which we recorded as subspecies *osmanica* at Kozhuh Hill, below) are listed as separate species in the 1996 European Checklist (Karsholt & Razowski, 1993), but in the Geometridae volume of *Catalogus Faunae Bulgaricae* (Nestorova, 1998), which is not in any way a taxonomic review, the former is treated as a synonym of latter. Karsholt & Razowski (*op. cit.*) list only *sicanaria* for Bulgaria, so if *conspersaria* is indeed a validly separate species it may be new to this country.

Sadly, our time in Struma was somewhat marred by the theft of LG's bag from inside the tent, whilst he lay asleep next to it. A camera, a couple of hundred quid and several specimens of Syrphidae were amongst the lost items. There was also some ethyl acetate in a small whisky bottle; we regret to report that unkind thoughts involving the thief drinking from the bottle did indeed cross our minds! We wasted almost an entire day reporting the incident to the police, making statements and showing them the scene of the crime. However, we were assured that whoever it was would certainly be caught. This on the basis that £200 to a Bulgarian rural peasant is rather like winning the jackpot of the National Lottery to an Englishman and, in view of the fact that the populace is, essentially, less than educated in this rural area, he or she would probably start spending it later the same day!

Our penultimate session led us into new territory – away from the calcareous influence and into the volcanic geology at Kozhuh Hill, where we set up base camp in a disused marble quarry on top at 41°.27'.36"N: 23°.15'.38"N, 240 metres above sea level, on 26 May. *Brachodes appendiculata* was not only a new moth for us but also a new family; the Brachodidae share, in Europe, the superfamily Sesioidea with the Sesiidae, neatly positioned between the Zygaenoidea and the Cossoidea – which technically makes them macros, I suppose.. Both the widespread and common *Dyspessa ululа*, and the much rarer *D. salicicola* were taken at the sheet in low numbers and so we were able to compare the two. Most interesting of all was perhaps *Cilix asiatica*, a Turkish species that is a relative newcomer to Europe and is not included in the 1996 European Checklist (Karsholt & Razowski, *op. cit.*). Without the keen eye of Stoyan Beshkov this would doubtless have been overlooked; it has very much restricted brownish markings in the termen of the forewing upper side. Interesting geometrids included *Neoguopharmia stevenaria*, *Nychiodes dalmatina* and *Dyscia sicanaria* ssp. *osmanica*; comments on the latter species were made under the discussion on the moths at Kresna. *Eupithecia spissilineata* proved that we really were doing things properly. I ask you! The pugs here in Blighty are bad enough without having to go off doing foreigners! At this point we ought to thank Barry Goater for recognizing that the specimen was probably this species, thus leading to CWP checking its genitalia for confirmation. Another interesting capture here was *Amata kruegeri* – to all intents and purposes identical to *A. phegea*. Although there are differences in the hindwing pattern it seems that these may not be constant and so genitalia of the male is the only reliable tool for correct separation. The third

European species, *A. ragazzii* (Turati) is not known outside Italy and so does not confuse the issue in Bulgaria. Finally, the arrival of *Noctua tertia* at the sheet was of interest. A momentary lapse led to a proclamation of "*janthe*!" but that species, of course, does not occur this far east. It is much larger than our *N. janthe*, and of course nothing like the much smaller and darker *N. janthina.*

For the final evening we had intended to set up lamps in the grassy meadows of the Rilska valley, above the famous Rilska Monastery in the village of Kirizova Polyana. Unfortunately, however, we were late arriving – for a variety of reasons that are really not worth going into. We arrived at the entrance to the grassy meadows at dusk, and drove along a sort of track to the furthest point from the village, primarily to avoid attracting the attention of the hundreds of tourists and religious pilgrims that visit the monastery on a daily basis. Van suitably parked on a level spot for the benefit of the kettle, LG and DF set about putting up a tent whilst CWP went to investigate a track that led into the trees. Not to put too fine a point on it, nature called. Standing minding his own business, against the corner of a disused cottage, in near total darkness under the trees, he heard a noise. He looked round. The noise suddenly materialised as two red glowing objects. Slowly, and still with only one usable hand to hold the torch, the red glows resolved into the eyes of a somewhat unhappy and rather large bull! Estimated distance to target ... two metres!!! Years of anti-panic training were instantly forgotten; the idea of *not* running suddenly seemed ludicrous! TWO METRES!!! He ran, closely pursued by the decidedly unhappy bull. For the first time since leaving behind compulsory athletics at school, some 35 years earlier, he hurdled the pine log that formed a barrier between the track and the safety of the field; 1.37 metres – probably a "personal best". Gathering his "cool", he walked casually up to the van and reported the incident. That was the point at which DF, a retired vet so he knows about these things, asked somewhat tentatively "is that the one just there?" and pointed to a large, dark object, with two red eyes and two rather large horns that was trotting directly at us, snorting angrily as it came. How it got over the barrier we do not know – it probably went through it! The rest we leave to the reader's imagination, but we are just thankful that nobody had a camera handy to record the sight of four grown men cowering inside a camper van in the middle of nowhere!

Eventually, beastie wandered off, calling to his cows. We reached a fairly rapid decision that it was unwise to set up lights here and so, taking it in turns to act as lookout, we took down the tent and started to look for an alternative site. Driving on up the track, for several kilometres, eventually we reached a point where the road simply vanished. That is to say most of it appeared to be several hundred feet below us at the base of the cliff. We back-tracked slightly, reversing the van in the near total darkness along the narrow, partly absent mountain track, until we reached a point where we felt *relatively* safe to execute a 23-point turn. A single vertical sheet was set up in the middle of the track at 42°.09'.07" N: 23°.25'.17" E, at 1,592 metres above sea level (you could say that it was the highpoint of the trip), surrounded by mixed woodland. *Hypena obesalis* (Paignton Snout) was amongst the first moths in, but had to more or less fight its way through the hordes of *Eupithecia tantillaria* (Dwarf Pug) and *Chloroclysta miata* (Autumn Green Carpet). The scarce lymantriid *Parocneria*

terebinthi also showed up, as did examples of *Shargacucullia prenanthis* and *Mythimna andereggii* ssp. *pseudocomma*.

Three examples of what we at first took to be particularly well-marked examples of *Odontopera bidentata* (Scalloped Hazel) continue to cause us minor problems. According to Stoyan, this species is very rare in Bulgaria (and absent from Greece). The common species is *O. graecarius*, and that is what he expected our examples to be. However, we remain not necessarily convinced of the taxonomic validity of the Balkan species – primarily because the type specimen in the Humboldt Museum (not seen by us) is a female and there are no descriptions of a male in the literature as far as we can tell. There are differences in the everted aedeagus between the two males in our sample and selected males of *O. bidentata* from Britain. However, there is a degree of variation in this feature amongst British examples and there is a need to establish whether the Bulgarian variation is sufficiently extreme for it to be a distinct species or if it is just part of an intra-specific cline across Europe. If any reader can spare a male of *O. bidentata* from Scotland, the north of England, Ireland or continental Europe CWP would be keen to borrow them for dissection as his own material is all from the south-east. Material from Greece is especially needed. We are unable to find any differences in genital structure between our Bulgarian female and British females.

We assumed that the trip home would be uneventful, yet it distinguished itself in two ways. One was the phenomenally good overnight session at Csákvár in western Hungary, though that will have to be a separate report. The other was the unexpected mobile phone text message received by CWP from his daughter in England whilst we were about half way across Romania. Memory fails, but it said something like "thief caught – please return to Struma to identify recovered items". It seems that the police were right – twenty-four hours after nicking the bag the thief went on a spending spree and was duly "grassed up" by someone. After all, if you earn less than a pound a month and then suddenly start driving around in a flashy motor someone is bound to notice! The police had contacted Stoyan; Stoyan contacted Stanislav; CWP's phone was in a poor reception area so Stanislav sent text to England and England sent text to Romania! Simple really! Anyway, full marks to a thoroughly efficient and surprisingly friendly Eastern European police force.

To date we have identified 265 species from Bulgaria. We have narrowed one more down to one of two species (*Lithostege griseata/farinata*), but we are unable to find reliable characters to separate the two and are not aware of any published genitalia drawings. There are also just a few in the unidentified box – a female pug (*Eupithecia* sp.) from Studen Kladenets, a different pug from Mount Zemen, an *Idaea* from Kozhuh Hill, a *Scopula* from both Kozhuh and Kresna and a *Gnophos* from Zemen. These may take a while, but when they are named we will have recorded 271 species in the six nights at the end of May 2002. Without the micros (but with the pyralids) our list falls to 247 species and, for seasonal comparison, Barry Goater's report of his two-week trip in September 1995 recorded 210 macro and pyrale species. Our full list of recorded species is presented in Table 1.

Further trips to record moths in Bulgaria are planned and CWP is always keen to hear from anyone who may care to join the team.

Acknowledgements

Stanislav Abadjiev's invitation to CWP to visit Bulgaria started the whole show on the road; without the incentive of "knowing somebody there" we might never have gone. We are extremely grateful to him, to his wife and to his daughter for their generous hospitality during our stay in their much under-rated country. Stanislav also took time off work to act as our guide and companion for the entire duration of our stay and for this we are especially grateful; as this was our first visit to Bulgaria we could not possibly have discovered such interesting places in the time available without his very considerable assistance. For much of the period of our stay we were also accompanied by Stoyan Beshkov (and Lisa the dog!), whose knowledge of Balkan Noctuidae, and where to find them, is second to none. Back in England, Martin Honey kindly allowed CWP access to the National Collection at the Natural History Museum (NHM) in London in order to identify difficult specimens. Barry Goater (Chandlers Ford), Norman Hall (Reading), Martin Honey (NHM), Mike Shaffer (NHM) and Gerry Tremewan (Truro) also gave valuable assistance with naming some difficult material. CWP also wishes to thank Peder Skou (Kopenhagen) for useful discussion on European *Odontopera* species and Stoyan Beshkov for the loan of specimens of *Odontopera graecarius*. Finally, Andrew Hardacre (Bishops Stortford) very kindly made digital images of unidentified moths so that they could be sent by e-mail to some of those mentioned above.

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Table 1. Moths (Lepidoptera) recorded in south-west Bulgaria, 22 May to 27 May 2002. For ease of interpretation, the serial numbers, sequence and nomenclature follow Karsholt & Razowski (1996); this differs in several respects from the British checklist normally used in this journal as well as from a number of more recent publications concerned with the European fauna. Sites are coded as follows:

1 = Osogovo Mountains, Studen Kladenets, 42°.13'.6"N: 22°.39'.36"E, 1338 metres, 22.v.2002.

2 = Mount Zemen, Polska Skakavitsa village, 42°.24'.36"N: 22°.40'.50"E; 690 metres, 23.v.2002.

3 = Skrino River: riverside area, 42°.12'.18"N: 22°.55'.56"E; 430 metres, 24.v.2002.

4 = Struma Valley, Kresna Gorge, 41°.45'.31"N: 23°.09'.29"E; 236 metres, 25.v.2002.

5 = The disused Marble Quarry at Kozhuh Hill, 41°.27'.36"N: 23°.15'.38"N; 240 metres, 26.v.2002.

6 = Rilska valley above Kirizova Polyana, 42°.09'.07"N: 23°.25'.17"E; 1592 metres, 27.v.2002.

Species recorded	Site
Gracillariidae	
1110: *Caloptilia alchimiella* (Scop.)	2
Plutellidae	
1525: *Plutella xylostella* (L.)	1, 2
Ethmiidae	
1655: *Ethmia bipunctella* (Fabr.)	2
Depressariidae	
1754: *Agonopterix furvella* (Tr.)	3
Oecophoridae	
2378: *Protasis punctella* (Costa)	2
Coleophoridae	
2644: *Coleophora valesianella* Zeller	2
Gelechiidae	
3261: *Isophrictis striatella* (D.& S.)	2
3285: *Metzneria aprilella* (H.- S.)	2
Brachodidae	
4004: *Brachodes appendiculata* (Esper)	5
Cossidae	
4156: *Parahypopta caestrum* (Hb.)	4
4163: *Dyspessa salicicola* (Eversmann)	5
4166: *Dyspessa ulula* (Borkh.)	2, 5
4176: *Zeuzera pyrina* (L.)	4
Tortricidae	
4268 *Agapeta hamana* (L.)	3
4279: *Eugnosta lathoniana* (Hb.)	4
: *Aphelia ferrugana* (D.& S.)	2
4475: *Cnephasia alticolana* (H.- S.)	1
4584: *Syndemis musculana* (Hb.)	1
4624: *Clepsis pallidana* (Fabr.)	2
4776: *Olethreutes arcuella* (Cl.)	2
5019: *Notocelia cynosbatella* (L.)	2, 3
5173: *Pammene fasciana* (L.)	1

Species recorded	Site
Epermeniidae	
5307: *Epermenia pontificella* (Hb.)	2
Pterophoridae	
5379: *Platyptilia miantodactylus* (Zell.)	3
5426: *Stenoptilia zophodactylus* (Duponchel)	2
5434: *Cnaemidophorus rhododactyla* (D.& S.)	5
5460: *Capperia celeusi* (Frey)	2, 3
5480: *Stangeia siceliota* (Zell.)	2
5485: *Pterophorus pentadactyla* (L.)	2
Pyralidae	
5574: *Melissoblaptes zelleri* Joannis	4
5614: *Synaphe antennalis* (Fabr.)	2
5627: *Pyralis farinalis* (L.)	4
5684: *Pyla fusca* (Haw.)	2
5742: *Etiella zinckenella* (Tr.)	3, 4
5652: *Hypsopygia costalis* (Fabr.)	4
5673: *Trachonitis cristella* (D.& S)	3
5690: *Pempeliella dilutella* (D. & S.)	2
5727: *Sciota adelphella* (F. v. R.)	4
5767: *Pempelia palumbella* (D.& S.)	2
5827: *Epischnia prodromella* (Hb.)	2
5846: *Lymphia chalybella* (Eversmann)	1
5904: *Pterothrixidia rufella* (Dup.)	3
5910: *Bradyrrhoa gilveolella* (Tr.)	4
5930: *Megasis rippertella* (Zell.)	2
6027: *Ancylosis cinnamomella* (Dup.)	3
6072: *Homoeosoma sinuella* (Fabr.)	3, 5
6165: *Scoparia subfusca* Haw.	3, 6
6172: *Scoparia pyralella* (D.& S.)	3
6174: *Scoparia ingratella* (Zell.)	3, 6
6207: *Euchromius ocellea* (Haw.)	2, 4
6340: *Xanthocrambus saxonellus* (Zinck.)	4, 5

Species recorded	Site
6348: *Chrysocrambus craterella* (Scop.)	1
6350: *Thisanotia chrysonenchella* (Scop.)	1, 2
6376: *Platytes cerussella* (D.& S.)	2, 4
6488: *Evergestis frumentalis* (L.) ssp. *asiaticalis* (Ragonot)	5
6507: *Evergestis aenealis* (D.& S.)	4
6531: *Udea ferrugalis* (Hb.)	2
6567: *Loxostege virescalis* (Guenée)	5
6568: *Loxostege deliblatica* Sz.I. & U-M. (= *lmebneri* Kocak)	3
6576: *Margaritia sticticalis* (L.)	5
6588: *Ecpyrrhorrhoe rubiginalis* (Hb.)	5
6595: *Pyrausta cingulata* (L.)	5
6599: *Pyrausta sanguinalis* (L.)	2, 3
6600: *Pyrausta castalis* (Tr.)	3
6604: *Pyrausta aurata* (Scop.)	4
6605: *Pyrausta purpuralis* (L.)	5
6624: *Sitochroa verticalis* (L.)	3
6649: *Ostrinia nubilalis* (Hb.)	5
6655: *Anania verbascalis* (D.& S.)	5
6661: *Paratalanta hyalinalis* (Hb.)	3
6700: *Dolicharthria punctalis* (D.& S.)	3
Lasiocampidae	
6755: *Macrothylacia rubi* (L.)	1, 2, 4
6771: *Phyllodesma ilicifolia* (L.)	2
6773: *Phyllodesma tremulifolia* (Hb.)	3
6780: *Odonestis pruni* (L.)	4
Saturniidae	
6793: *Saturnia pyri* (D.& S.)	2
Sphingidae	
6816: *Marumba quercus* (D.& S.)	2, 3, 5
6819: *Mimas tiliae* (L.)	2, 3, 4
6822: *Smerinthus ocellata* (L.)	3, 4
6824: *Laothoe populi* (L.)	3, 4
6828: *Agrius convolvuli* (L.)	5
6832: *Sphinx ligustri* (L.)	4
6834: *Hyloicus pinastri* (L.)	2
6851: *Rethera komarovi* (Christoph) ssp. *drilon* Rbl. & Zy.	4
6853: *Hyles euphorbiae* (L.)	2, 3, 4, 5
6858: *Hyles vespertilio* (Esper)	4
6863: *Deilephila porcellus* (L.)	1, 2
Thyatiridae	
7485: *Tethea ocularis* (L.)	3, 4
Drepanidae	
7503: *Watsonalla binaria* (Hufn.)	4
7505: *Watsonalla cultraria* (Fabr.)	1
7512: *Cilix glaucata* (Scop.)	2, 3
——: *Cilix asiatica* Bang-Haas, 1907	5
Geometridae	
7527: *Lomaspilis marginata* (L.)	6
7530: *Ligdia adustata* (D.& S.)	2, 3
7534: *Stegania dilectaria* (Hb.)	3
7537: *Heliomata glarearia* (D.& S.)	2, 5
7547: *Chiasmia clathrata* (L.)	1, 2, 3
7570: *Tephrina murinaria* (D.& S.)	2, 3
7581: *Neognophamia stevenaria* (Boisd.)	5
7596: *Petrophora chlorosata* (Scop.)	1
7607: *Plagodis dolabraria* (L.)	1
7613: *Opisthograptis luteolata* (L.)	1
7622: *Eilicrinia cordiaria* (Hb.)	3
7624: *Eilicrinia trinotata* (Metzner)	3
7647: *Odontopera bidentata* (Cl.) [but see text]	?6
7648: *O. graecarius* A. Bang-Haas, 1910	?6
7686: *Biston betularia* (L.)	6
7720: *Nychiodes dalmatina* Wagner	5
7733: *Synopsia sociaria* (D.& S.)	2
7754: *Peribatodes rhomboidaria* (D.& S.)	3, 4
7761: *Peribatodes umbraria* (Hb.)	2
7773: *Cleora cinctaria* (D.& S.)	1
7794: *Ascotis selenaria* (D.& S.)	4
7822: *Bupalus piniaria* (L.)	3
7824: *Cabera pusaria* (L.)	6
7826: *Cabera exanthemata* (Scop.)	3
7850: *Dichrognophos sartata* (Tr.)	4, 5
7882: *Euchrognophos mucidaria* (Hb.)	4
7916: *Siona lineata* (Scop.)	3
7926: *Semiaspilates ochrearia* (Rossi)	5
7928: *Dyscia conspersaria* (D.& S.)	4
7933: *Dyscia sicanaria* (Oberthür) ssp. *osmanica* Wagner	5
7939: *Perconia strigillaria* (Hb.)	3, 4
7975: *Antonechloris smaragdaria* (Fabr.)	3, 4
7982: *Chlorissa viridata* (Hb.)	2
7984: *Chlorissa etruscaria* (Zell.)	4
7987: *Microloxia herbaria* (Hb.)	5
8000: *Hemistola chrysoprasaria* (Esper)	4
8005: *Encrostes idigenata* (Villers)	4, 5
8017: *Cyclophora puppillaria* (Hb.)	4, 5, 6
8019: *Cyclophora porata* (L.)	4, 5
8020: *Cyclophora quercimontaria* (Bastelberger)	3
8022: *Cyclophora punctaria* (L.)	5
8024: *Cyclophora linearia* (Hb.)	1, 2
8045: *Scopula ornata* (Scop.)	3
8051: *Scopula decorata* (D.& S.)	2
8054: *Scopula rubiginata* (Hufn.)	2, 3, 4
8055: *Scopula ochraceata* (Stdgr.)	3
8059: *Scopula marginepunctata* (Goeze)	2, 3, 4
8060: *Scopula incanata* (L.)	2
8079: *Glossotrophia confinaria* (H.- S.)	4
8110: *Idaea filicata* (Hb.)	1, 2, 3, 4, 5
8180: *Idaea ostrinaria* (Hb.)	3, 4, 5
8167: *Idaea subsericeata* (Haw.)	2
8186: *Idaea degeneraria* (Hb.)	2, 3, 4, 5
8187: *Idaea straminata* (Borkh.)	2, 3

Species recorded		Site
8222:	*Lythria cruentaria* (Hufn.) (= *rotaria*)	4
8223:	*Cataclysme riguata* (Hb.)	1
8233:	*Scotopteryx vicinaria* (Dup.)	2
8240:	*Scotopteryx mucronata* (Scop.)	1
8241:	*Scotopteryx luridata* (Hufn.)	1, 6
8249:	*Xanthorhoe designata* (Hufn.)	6
8255:	*Xanthorhoe montanata* (D.& S.)	1, 2
8256:	*Xanthorhoe fluctuata* (L.)	1, 2, 6
8258:	*Xanthorhoe oxybiata* (Millière)	2
8267:	*Catarhoe permixtaria* (H.- S.)	4, 5
8269:	*Catarhoe cuculata* (Hufn.)	1
8275:	*Epirrhoe alternata* (Müll.)	2, 3
8284:	*Protorhoe unicata* (Guenée)	4
8287:	*Costaconvexa polygrammata* (Borkh)	4, 5
8289:	*Camptogramma bilineata* (L.)	4
8309:	*Anticlea badiata* (D.& S.)	6
8316:	*Lampropteryx suffumata* (D.& S.)	1
8319:	*Cosmorhoe ocellata* (L.)	2
8342:	*Chloroclysta miata* (L.)	6
8362:	*Thera juniperata* (L.)	2
8400:	*Horisme vitalbata* (D.& S.)	2, 3, 4
8401:	*Horisme corticata* (Tr.)	3, 4
8402:	*Horisme tersata* (D.& S.)	3
8463:	*Perizoma albulata* (D.& S.)	1, 6
8477:	*Eupithecia haworthiata* Doubleday	3
8483:	*Eupithecia linariata* (D.& S.)	2
8513:	*Eupithecia breviculata* (Donzel)	3, 5
8519:	*Eupithecia iutricata* (Zett.)	1
8564:	*Eupithecia spissilineata* (Metzner)	5
8579:	*Eupithecia dodoneata* (Guen.)	2
8596:	*Eupithecia tantillaria* Boisd.	1, 6
8599:	*Gymnoscelis rufifasciata* (Haw.)	4, 5
8603:	*Rhinoprora rectangulata* (L.)	4
8604:	*Rhinoprora chloerata* (Mabille)	2, 3
8620:	*Aplocera plagiata* (L.)	1, 6
8638/9:	*Lithostege griseata* (D.& S.) /*farinata* (Hufn.)	3
8668:	*Trichopteryx carpinata* (Borkh.)	6
Notodontidae		
8698:	*Clostera curtula* (L.)	2, 4, 5
8708:	*Furcula furcula* (Cl.)	1
8710:	*Furcula bifida* (Brahm)	3, 4
8719:	*Notodonta ziczac* (L.)	1, 6
8721:	*Drymonia dodonaea* (D.& S.)	1, 2
8724:	*Drymonia querna* (D.& S.)	1
8727:	*Pheosia tremula* (Clerck)	3, 4
8728:	*Pheosia gnoma* (Fabr.)	6
8732:	*Pterostoma palpina* (Clerck)	3, 6
8738:	*Ptilodon capucina* (L.)	1, 6
8744:	*Rhegmatophila alpina* (Bellier) ssp. *osmana* Friedel	4
8750:	*Phalera bucephala* (L.)	3
8754:	*Peridea anceps* (Goeze)	3
8758:	*Stauropus fagi* (L.)	1, 4
8760:	*Harpyia milhauseri* (Fabr.)	2
8762:	*Spatalia argentina* (D.& S.)	2, 3,5
Noctuidae		
8777:	*Acronicta psi* (L.)	2, 4, 5
8778:	*Acronicta aceris* (L.)	2, 3
8784:	*Acronicta euphorbiae* (D.& S.)	2, 4
8786:	*Acronicta orientalis* Mann	4
8787:	*Acronicta rumicis* (L.)	2
8789:	*Craniophora ligustri* (D.& S.)	4
8792:	*Simyra nervosa* (D.& S.)	4
8835:	*Idia calvaria* (D.& S.)	2
8853:	*Pechipogo plumigeralis* (Hb.)	4
8856:	*Zanclognatha lunalis* (Scop.)	4
8861:	*Hypenodes anatolica* Schwing.	4
8897:	*Minucia lunaris* (Bartel)	1
8900:	*Clytie syriaca* (Bugnion)	4
8904:	*Dysgonia algira* (L.)	4
8909:	*Prodotis stolida* (Fabr.)	5
8918:	*Drasteria cailino* (Lefèbvre)	2
8934:	*Lygephila craccae* (D.& S.)	2, 5
8956:	*Catephia alchymista* (D.& S.)	4, 5
8959:	*Aedia leucomelas* (L.)	5
8965:	*Tyta luctuosa* (D.& S.)	5
8969:	*Euclidia glyphica* (L.)	5
8973:	*Gonospileia triquetra* (D.& S)	2
8979:	*Zethes insularis* Rambur	4
8984:	*Scoliopteryx libatrix* (L.)	4
8992:	*Rhynchodontodes antiqualis* (Hb.)	2, 3, 4
8996:	*Hypena obesalis* (Tr.)	3, 6
9023:	*Eutelia adulatrix* (Hb.)	4, 5
9045:	*Diachrysia chrysitis* (L.)	2, 3
9056:	*Autographa gamma* (L.)	2, 3
9081:	*Trichoplusia ni* (Hb.)	5
9094:	*Abrostola agnorista* (Dufay)	4
9097:	*Emmelia trabealis* (Scop.)	4
9100:	*Acontia lucida* (Hufn.)	4
9111:	*Phyllophila obliterata* (Rambur)	5
9114:	*Protodeltote pygarga* (Hufn.)	3
9146:	*Eublemma amoena* (Hb.) (= *respersa* auctt.)	4
9147:	*Eublemma purpurina* (D.& S.)	4, 5
9217:	*Cucullia tanaceti* (D. & S.)	2
9230:	*Shargacucullia thapsiphaga* (Tr.)	5
9234:	*Shargacucullia prenanthis* (Boisd.)	6
9240:	*Calophasia lunula* (Hufn.)	2
9245:	*Calophasia opalina* (Esper)	2, 3
9251:	*Ouphalophana antirrhinii* (Hb.)	2, 5
9275:	*Copiphana olivina* (H.- S.)	3
9358:	*Schinia scutosa* (D.& S.)	5
9364:	*Heliothis viriplaca* (Hufn.)	2, 4
9367:	*Heliothis peltigera* (D.& S.)	5
9370:	*Heliothis armigera* (Hb.)	5

Species recorded	Site
9391: *Apaustis rupicola* (D.& S.)	5
9424: *Platyperigea kadenii* (Freyer)	4
9430: *Paradrina selini* (Boisd.)	2, 3
9433: *Paradrina clavipalpis* (Scop.)	2, 3, 4
9436: *Paradrina flavirena* (Guenée)	4
9450: *Hoplodrina blanda* (D.& S.)	4, 5
9454: *Hoplodrina ambigua* (D.& S.)	2, 4, 5
9456: *Charanycha trigrammica*	2, 3, 4
9467: *Pseudoxestia apfelbecki* (Rebel)	2, 4
9476: *Athetis pallustris* (Hb.)	3
9481: *Dypterygia scabriuscula* (L.)	3, 4
9516: *Actinotia radiosa* (Esper)	5
9518: *Chloantha hyperici* (D.& S.)	4, 5, 6
9536: *Parastichtis suspecta* (Hb.)	5
9537: *Parastichtis ypsillon* (D.& S.)	4
9544: *Dicycla oo* (L.)	4, 5
9547: *Cosmia confinis* H.- S.	5
9550: *Cosmia trapezina* (L.)	5
9600: *Conistra vaccinii* (L.)	6
9666: *Lithophane merckii* (Rambur)	4
9741: *Mniotype adusta* (Esper)	6
9748: *Apamea monoglypha* (Hufn.)	5
9759: *Apamea furva* (D.& S.)	4
9782: *Oligia latruncula* (D.& S.)	3, 4
9895: *Discestra trifolii* (Hufn.)	2, 4, 5
9912: *Lacanobia w-latinum* (Hufn.)	1, 2, 3
9917: *Lacanobia oleracea* (L.)	3, 4
9918: *Lacanobia thalassina* (Hufn.)	1
9928: *Hecatera bicolorata* (Hufn.)	3, 5
9930: *Hecatera cappa* (Hb.)	5
9935: *Hadena luteago* (D.& S.)	3
9940: *Hadena confusa* (Hufn.)	3, 6
9944: *Hadena albimacula* (Borkh.)	4
9945: *Hadena magnolii* (Boisd.)	2, 3
9955: *Hadena rivularis* (Fabr.)	3
9957: *Hadena perplexa* (D.& S.)	2, 4
9962: *Hadena syriaca* (Osthelder)	4
9968: *Sideridis lampra* (Schawerda)	2
10002: *Mythimna albipuncta* (D.& S.)	1, 2, 3, 4
10003: *Mythimna vitellina* (Hb.)	2, 3, 4, 5
10022: *Mythimna l-album* (L.)	4, 6
10027: *Mythimna andereggii* Boisd. ssp. *pseudocomma*	1, 6
10028: *Mythimna sicula* ssp. *sicula* (Tr.)	2
10029: *Mythimna sicula* ssp. *scirpi* (Duponchel)	3
10054: *Egira conspicillaris* (L.)	1, 2, 6
10068: *Pachetra sagittigera* (Hufn.)	1, 2, 3, 6
10086: *Ochropleura plecta* (L.)	2
10096: *Noctua pronuba* L.	5
10099: *Noctua comes* Hb.	5
10100: *Noctua fimbriata* (Schreb.)	5
10104: *Noctua tertia* Ment., Mob. & Fib.	5
10199: *Xestia c-nigrum* (L.)	2, 4
10224: *Cerastis rubricosa* (D.& S.)	6
10238: *Peridroma saucia* (Hb.)	2
10314: *Yigoga forcipula* (D.& S.)	5
10348: *Agrotis exclamationis* (L.)	1, 2, 3, 4, 5
10360: *Agrotis cinerea* (D.& S.)	2, 3
Pantheidae	
10372: *Colocasia coryli* (L.)	1
Lymantriidae	
10385: *Parocneria terebinthi* (Freyer)	6
10387: *Calliteara pudibunda* (L.)	2
10407: *Penthophera morio* (L.)	2
Nolidae	
10424: *Meganola gigantula* (Stdgr.)	4
10425: *Meganola albula* (D.& S.)	4
10429: *Nola confusalis* (H.- S.)	1
10437: *Nola chlamitulalis* (Hb.)	3
10444: *Nycteola asiatica* (Krul.)	5
10456: *Earias clorana* (L.)	3, 4
10459: *Earias vernana* (Fabr.)	3
Arctiidae	
10490: *Eilema complana* (L.)	3
10493: *Eilema caniola* (Hb.)	2, 4, 5
10495: *Eilema pygmaeola* (Doubleday) ssp. *pallifrons* (Zell.)	4
10499: *Eilema sororcula* (Hufn.)	3, 4
10514: *Setina roscida* (D.& S.)	2
10517: *Amata phegea* (L.)	4
10519: *Amata kruegeri* (Ragusa)	5
10522: *Dysauxes famula* (Freyer)	4
10548: *Watsonarctia casta* (Esper = *deserta* Bartel	1
10550: *Phragmatobia fuliginosa* (L.)	5
10566: *Spilosoma lutea* (Hufn,)	2
10567: *Spilosoma lubricipeda* (L.)	3, 4
10568: *Spilosoma urticae* (Esper)	3
10600: *Arctia villica* (L.)	2, 3, 4